

Watershed/Urban Regeneration in Accord with Nature

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1. National Strategy on Science and Technology

The Council for Science and Technology Policy (CSTP, Cabinet Office) guides Japan's national policy on science and technology development. It has set four primary strategic priorities, and four secondary: (1) life sciences, (2) information and telecommunications, (3) environmental sciences, (4) nanotechnology and materials, along with (5) energy, (6) manufacturing technology, (7) infrastructure, and (8) frontiers.

One of the four top priorities, Environmental Sciences has three interdisciplinary, inter-ministry projects for launch in FY 2002: "Global Warming," "Zero-Waste Resource Recycling," and "Watershed/Urban Regeneration in Accord with Nature." Future research will include "Total Risk Management Technology Pertaining to Chemical Substances," and "Changes in the Global Hydrological Cycle," for a total of five projects.¹

The work of "Technologies of Watershed/Urban Regeneration in Accord with Nature" comprises an intense research and development (R&D) initiative for the management of watersheds, including urban areas, and as such, is inseparable from infrastructure programming. The following discusses the background and contents of the initiative, as well as thoughts on the work required.

2. Plans for Watersheds and Urban Areas

The Third Comprehensive National Development Plan (1977), adopted some 25 years ago, came in an era of rapid economic growth. In replacing the earlier Japanese Islands Reform Plan, it called for 'stable' over 'rapid' growth, and envisioned development of garden cities and balanced living environments. The plan for balanced living environments focused on river systems. In effect, it was a watershed plan.

This watershed plan attempted to curb unrestrained development and unbridled growth. However, continuing economic expansion and development of traffic, transport, information and communication networks allowed the plan to be actually implemented only in limited areas, such as the Chubu District's Yahagi River basin and the upper reaches of Miyazaki's Gokase River.

Responding to increased urbanization and centralization in the metropolis of Tokyo, the 4th Comprehensive National Development Plan (NDP, 1987) called for dispersal and decentralization. There was no mention of watershed conservation.

The 5th NDP (1997), which dealt with the burst of the economic bubble and declining population, was no longer a "comprehensive development plan," and there fore was named the "Grand Design for the 21st Century." This plan called for participation and cooperation, renovation of metropolitan areas, establishing nature-rich residential areas, forming regional cooperation corridors, and once again, watershed restoration.²

3. Yesterday, Today and Tomorrow

Let us review the stories of land, human life, and watershed/urban centers over the flow of time.

Fig. 1 shows Japan's demographic changes over a span of the last 1,000 years. The phenomenon of urban concentrations appeared only in the last 400 years. In early Edo (1600's), Japan's population tripled from just 10 million to some 30 million, where it remained for the 200 years of the Edo Period. Population exploded at the beginning of the Meiji Period (approx. 130 yrs. ago). In 100 years, the population tripled from 40 million to just below 130 million today (quadrupled from the early Meiji Period). The majority of people today live in the flood plains located between the mountains and the ocean, or in the highlands.

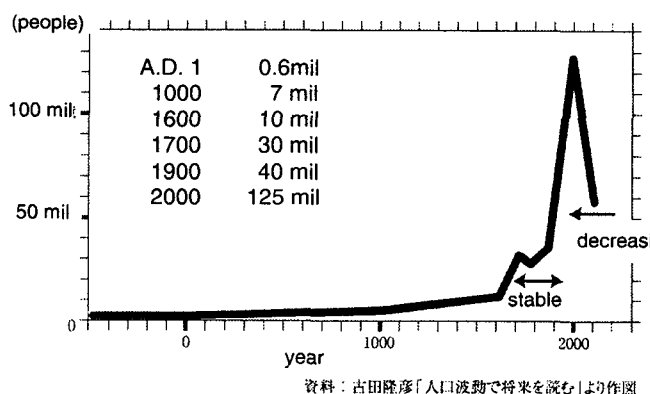


Figure 1: Population of Japan (1): Last 1,000 years³

Figure 2 shows the changes in Japan's population over the last 100 years. Also shown for comparison of the growth patterns are the demographics for France and England. Compared to France and England, Japan experienced a population explosion in the post-Meiji Period. Population rises led to urbanization, in their turn giving rise to various urban and environmental problems.

which we still face today. As shown in Fig. 3's world population projections, Japan's latest population explosion may have been the precursor to the "Explosion to 3 Billion" in which the Asian states now find themselves.

In the future too, Japan will be one of the first advanced nations to experience sharp population declines. It is estimated that Japan's population will fall by a half over the next 100 years (medium estimate).

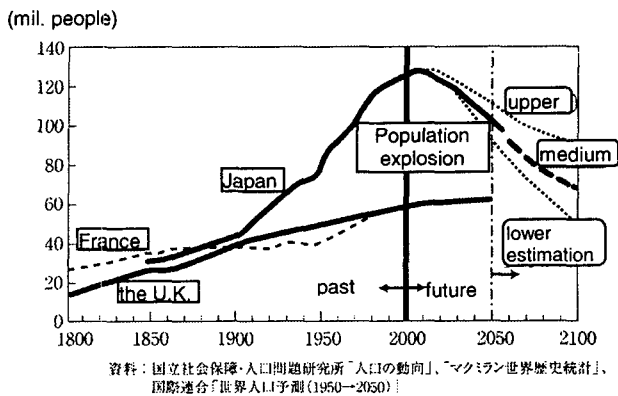


Figure 2: Population of Japan (2): Last 100 Years ⁴

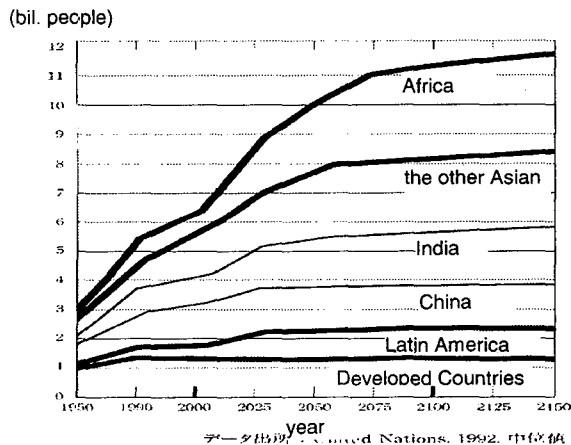


Figure 3: Population of the World ³

Next, let us explore the history and future of watersheds and urban areas, in light of their relationship with population trends.

During the Edo Period, the population reached 30 million. Developed along riverbanks, Edo and the other Japanese societies of the time were river cultures heavily imbued in nature. Settlements concentrated along major river ways, giving rise to over 300 feudal domains (—equates to number of today's small electoral districts). Such river cultures continued through the Meiji Period and later to the years just before World War II. The Edo Period societies were completely self-sustaining. When the population hit 70 million just before

before World War II, emigration to Manchuria began, possibly reflecting the limitations on self-sustainment. Nonetheless, these societies were basically self-supporting.

Japanese societies were still centered on river systems and watershed areas at the end of World War II, when the population was at some 72 million. This remained unchanged when Japan's tremendous economic growth spurt began, with the population near 100 million. But this has all been lost, it appears, in the past 30 years.

Now, as our population declines, we are likely to face demands for national land, urban center and watershed development, markedly different from the development programs of the past that focused on economic efficiency and convenience. One goal would be to recover and restore what has been lost in the past 30 years. Development projects could focus on river systems and watersheds to regenerate urban centers existing in accord with nature. To better live with nature and with her disasters, new land use plans may move the population out from flood plains and other disaster-prone areas to safer locations. Restoration of Tokyo Bay and other coastal zones, ocean areas, and lakes could also be part of such efforts.

4. The Initiative for Watershed/Urban Regeneration in Accord with Nature

Loss of natural habitats, human-induced environmental pollution, and the issue of cityscapes in today's watersheds and urban centers are the negative impacts of what took place in the latter half of the 20th Century. Fig. 4 is a view of the watersheds and urban centers in the Tokyo metropolitan area.

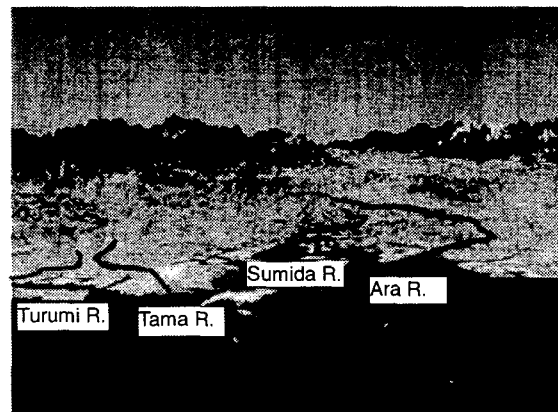


Fig. 4: Example of Watersheds and Urban Centers (Tokyo metropolitan area)

Japan's future goal is to maintain national and local vitality while minimizing these negative impacts of the past, even as it confronts declining population, fewer

children, and an aging society. Efforts to come to terms with nature in a sustainable manner, whether it be cities in symbiosis with or parasitic on nature, have global significance in the context of our neighbors in the Asian monsoon region who are facing drastic population increases and urbanization.

Civic movements for the environment, both here in Japan and abroad, often take the watershed approach. Excellent examples include the U.K. campaign for the Mersey River which flows through Manchester and Liverpool (Mersey River Basin Campaign), activities in the Rhine River watershed⁵, various U.S. programs promoting watershed approaches, and the efforts in Japan's Tsurumi River watershed. These environmental campaigns involve cooperation between government, businesses, civic groups, and residents.

The Initiative for Watershed/Urban Regeneration in Accord with Nature focuses on research and development (R&D) for watershed/urban regeneration from the environmental standpoint. It views the watershed as a unit encompassing the hydrological cycle, material circulation, and ecosystem, and supporting the urban area.

The need for the Initiative is: (1) Japanese cities developed and grew on the natural foundations of the watershed. (2) The urban concentration of the population and the economy overburdened the watershed environment. (3) This led to collapse of the watershed's natural foundations, on which the cities depend, giving rise to the need for conservation and restoration of the entire watershed. The Initiative offers recommendations on how to balance between cities and nature (e.g., establishing greater autonomy of the cities, creating an orderly boundary between the city and surrounding areas). The Initiative calls for R&D in: (1) environmental monitoring of the city and watershed, (2) city/watershed management model, (3) technology that promotes coexistence with nature, and, (4) drafting and implementing plans for establishment of societies in harmony with nature.

The Government side involves collaboration among and between the Ministries of the Environment, of Agriculture, Forestry and Fisheries, of Health, Labor and Welfare, of Education, Culture, Sports, Science and Technology, and of Land, Infrastructure and Transport, to promote this Initiative. The Initiative deals with national land management of watersheds and cities, and as such, will be a major focus for the Ministry of Land, Infrastructure and Transport, as well as for scholars, researchers, concerned academic societies, and NPO's.

The five ministries have presented R&D themes and goals. The four programs noted earlier have been divided into six R&D subjects: (1) monitoring and understanding phenomena; (2) development of water-

shed management models; (3) development of cultural/social analysis and evaluation systems; (4) development of nature restoration technology; (5) information infrastructure development; and (6) drafting an implementation of regeneration programs (Fig. 5-6). All involved ministries have agreed that the Initiative is not a mere R&D program, but is a grand social experiment on watershed/urban regeneration, and incorporate comprehensive execution programs.

The proposal calls for development of all required policy tools over three years, application to model watersheds and cities in five years, then application to all major watersheds and cities in 10 years (Fig. 7).

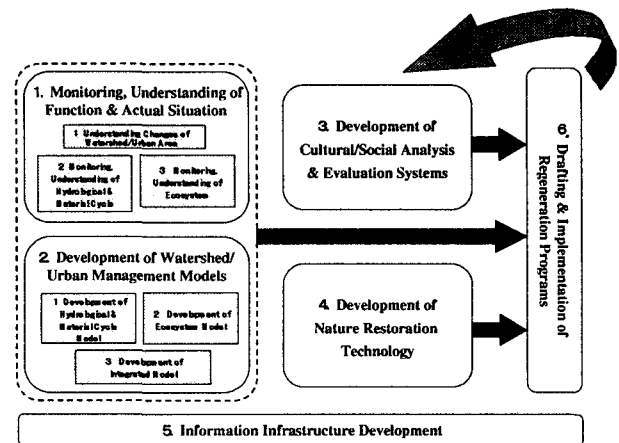


Fig. 5: The Initiative

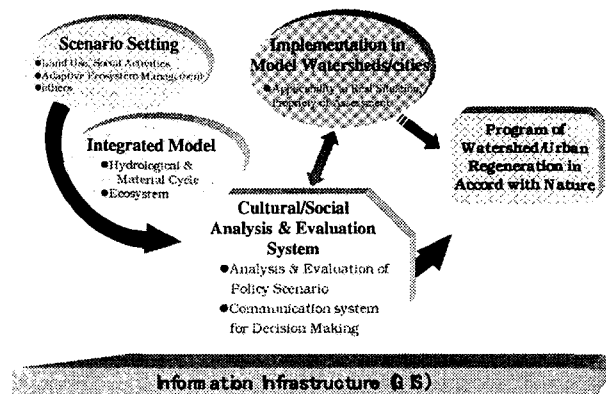


Fig. 6: Cultural/Social Analysis and Evaluation

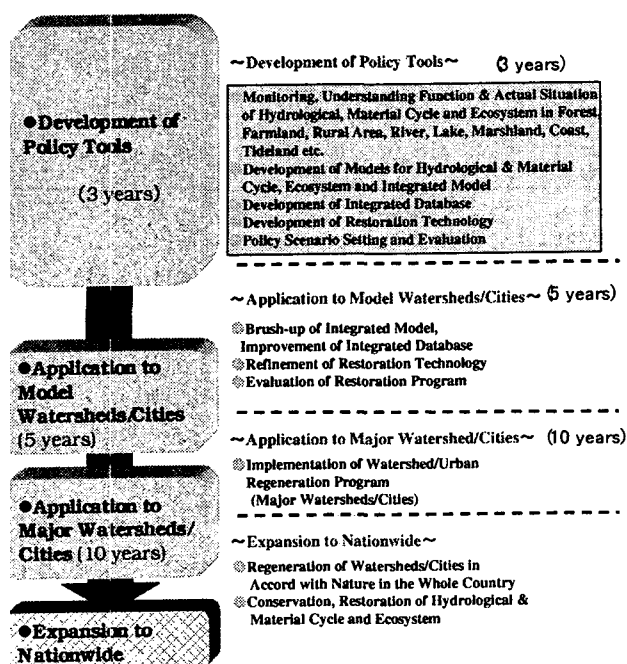


Fig. 7: Proposed Initiative Goals

Call for Participation

As we saw in the Third Comprehensive National Development Plan, watershed/urban planning cannot be successfully implemented unless it is in tune with the demands of the times. A new, broader plan for watersheds and cities encompassing urban regeneration is essential for the coming age of declining population and aging society.

The Initiative for Watershed/Urban Regeneration in Accord with Nature, incorporating the urgent and focal issue of urban regeneration, is now a national program ranked equally with the Global Warming Initiative. As such, it is an achievable initiative that will contribute to creating watersheds and cities in harmony with nature.

The Initiative allows government, businesses, civic groups and residents to tackle global environmental issues at the local, immediate level (e.g., watersheds, river systems). The symbiosis of man's urban habitats and nature, or cities in balance with Nature, is a global concern related to the issues of global warming and changes in the global hydrological cycle.

The implementation of the Initiative requires broad commitment and participation. It is hoped that researchers, research institutes, universities, academic societies, industries, residents and civic groups will collectively share study results and coordinate their actions. Of course, we will work to ensure and facilitate such participation.

Bibliography

- 1) Council for Science and Technology Policy, *Strategies by Fields*, September 2001 (refer to Cabinet Office website).
- 2) Shimokobe, Atsushi, *Testament to Postwar National Land Plans*, Nippon Keizai Hyoronsha, 1994/National Land Council, *The Fifth Comprehensive National Land Development Plan (Grand Design for the 21st Century – Promotion of Regional Independence and Creation of A Beautiful National Land)*, 1998.
- 3) Yoshikawa, Katsuhide, *The Water Environments of Southeast and East Asia*, pages 14-27 (“Overview of Asia’s water environment”), Architectural Institute of Japan, 2000.
- 4) Ministry of Construction, *Present State of National Land Construction*, page 4, 1999.
- 5) Yoshikawa, Katsuhide, “England’s Mersey River Basin Campaign,” *Kasen*, September 1997 edition/co-author, *Local Cooperation Changes Cities and the Nation*, Shogakkan, 1990.